CLAIMS

1. A signal processor for converting digital images for use in an imaging system, comprising

a digital data memory adapted for storing digital data representing an image having the properties of a circular field-of-view and objects in the field-of view being substantially in focus,

a control input for receiving a signal representing a selection of a portion of the image, and

a converter, responsive to said control input, for converting stored digital data in said digital data memory representing the selected portion into digital data representing a planar image for display.

2. A signal processor as recited in claim 1, said converter utilizing an orthogonal set of transformation algorithms.

3. A signal processor as recited in claim 1, said converter continuously converting at the rate of a television signal.

4. A signal processor as recited in claim 1, said control input for receiving signals representing zenith and azimuth angles of the selected image portion.

5. A signal processor as recited in claim 1, said input for receiving a plurality of signals and said converter for converting stored digital data in said digital data memory representing each selected portion to digital data representing corresponding ~~planar~~ perspective-corrected images.

6. A signal processor as recited in claim 1, wherein said image is received from a fisheye lens.

7. A signal processor as recited in claim 3 wherein said rate is at least thirty images per second.

8. A signal processor as recited in claim 4, said input for further receiving signals representing an object plane rotation angle.

9. A signal processor as recited in claim 4, said input for further receiving signals representing a level of magnification.

10. A signal processor as recited in claim 1, wherein said image is received from a wide angle lens.

11. A method of converting a digital image for use in an imaging system comprising the steps of

storing digital data representing an image having the properties of a circular field-of-view and objects in the field-of view being substantially in focus,

selecting a portion of said image, and

converting stored digital data representing the selected portion into digital data representing a planar image for display.

12. A method as recited in claim 11 wherein said converting step utilizes an orthogonal set of transformation algorithms.

13. A method as recited in claim 11, wherein said converting step is repeated at the rate of a television signal.

14. A method as recited in claim 11, wherein said selecting step comprises the step of selecting at least a zenith angle representing the selected image portion.

15. A method as recited in claim 11 wherein said selecting step comprises the step of selecting a plurality of portions of said image, and said converting step comprises the step of converting stored digital data representing each of said selected portions to digital

data representing corresponding ~~planar~~ perspective-corrected images.

16. A method as recited in claim 13 wherein said rate is at least thirty images per second.

17. A method as recited in claim 11 wherein said image is received from a fisheye lens.

18. A method as recited in claim 13 wherein said selecting step further comprises selecting an object plane angle of rotation.

19. A method as recited in claim 13 wherein said selecting step further comprises the step of selecting a degree of magnification.

20. A method as recited in claim 11 wherein said image is received from a wide angle lens.

21. A method of converting a digital image for use in an imaging system comprising the steps of:

storing digital data representing a partial spherical image; and

converting digital data representing a selected portion of the partial spherical image into digital data representing a planar view for display.

22. A signal processor for converting digital images for use in an imaging system, comprising:

a digital data memory for storing digital data representing an image having the properties of a circular field-of-view and objects in the field-of view being substantially in focus,

a control input for receiving a signal representing a selected viewing angle, and

a converter, responsive to said control input, for processing the stored digital data according to the selected viewing angle and outputting a planar image for

display.

23. A method for converting digital images for use in an imaging system, comprising the steps of:

storing digital data representing an image having the properties of a circular field-of-view and objects in the field-of-view being substantially in focus,

selecting a viewing angle, and

processing, responsive to the selected viewing angle, the stored digital data according to the selected viewing angle to output a planar image for display.

24. A signal processor for use in an imaging system, comprising:

a control input for receiving a signal representing a selection of a portion of an image having the properties of a circular field-of-view and objects in the field-of view being substantially in focus; and

a converter, responsive to the control input, for converting stored digital data representing the selected portion to digital data representing a planar image for display.

25. A memory for a signal processor, comprising:

a data structure, responsive to a control input representing a selection of a portion of an image stored in said memory, said data structure representing an orthogonal set of transformation algorithms; and

a buffer memory adapted to store digital image data for transformation.

26. A memory as recited in claim 25 wherein said data structure transforms data according to the following equations:

$$x = \frac{R[\,uA - vB + mR\sin\beta\sin\partial\,]}{\sqrt{u^2+v^2+m^2R^2}}$$

$$y = \frac{R[\,uC - vD - mR\sin\beta\cos\partial\,]}{\sqrt{u^2+v^2+m^2R^2}}$$

where:

$A = (\cos\phi\cos\partial - \sin\phi\sin\partial\cos\beta)$
$B = (\sin\phi\cos\partial + \cos\phi\sin\partial\cos\beta)$
$C = (\cos\phi\sin\partial + \sin\phi\cos\partial\cos\beta)$
$D = (\sin\phi\sin\partial - \cos\phi\cos\partial\cos\beta)$

and where:
R = radius of the image circle
β = zenith angle
∂ = Azimuth angle in image plane
ϕ = Object plane rotation angle
m = Magnification
u,v = object plane coordinates
x,y = image plane coordinates.

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27. A memory for a signal processor, comprising:

a data structure, responsive to a control input representing a selection of a portion of an image, said data structure representing an orthogonal set of transformation algorithms.

28. A signal processor for converting digital images, comprising:

a memory for storing digital data representing an input image having the properties of a circular field-of-view and objects in the field-of view being substantially in focus,

a control input for receiving a signal representing a selection of a portion of the input image, and

a digital converter, responsive to said control input, for converting stored digital data in said memory representing the selected portion of the input image into digital data representing a planar image, wherein said planar image is one of a panned, tilted, rotated and magnified version of the input image.

29. The signal processor of claim 28, further comprising image capture means, coupled to said memory, for continuously capturing said input image and storing it into said memory, wherein said digital converter continuously converts said stored digital data into said ~~planar~~ perspective-corrected image.

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30. The signal processor of claim 29, wherein said image capture means comprises a fish-eye lens.

31. The signal processor of claim 29, further comprising a second memory, coupled to said digital converter, for storing said ~~planar~~ perspective-corrected image.

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